CLAIMS

1. A laser irradiation apparatus comprising:

a first laser oscillator;

a second laser oscillator;

a slit for blocking an end portion of a first laser beam emitted from the first laser oscillator;

a condensing lens;

means for delivering a second laser beam emitted from the second laser oscillator so as to cover a range irradiated with the first laser beam on an irradiation surface;

means for moving the irradiation surface in a first direction relative to the first laser beam and the second laser beam; and

means for moving the irradiation surface in a second direction relative to the first laser beam and the second laser beam.

2. A laser irradiation apparatus comprising:

a first laser oscillator;

a second laser oscillator;

a diffractive optical element;

a slit for blocking an end portion of a first laser beam emitted from the first laser oscillator;

a condensing lens;

means for delivering a second laser beam emitted from the second laser

oscillator so as to cover a range irradiated with the first laser beam on an irradiation surface after passing through the diffractive optical element;

means for moving the irradiation surface in a first direction relative to the first laser beam and the second laser beam; and

means for moving the irradiation surface in a second direction relative to the first laser beam and the second laser beam.

3. The laser irradiation apparatus according to Claim 1 or 2, wherein the first laser beam is a harmonic converted by a non-linear optical element.

4. The laser irradiation apparatus according to any one of Claims 1 to 3,

wherein the first laser oscillator and the second laser oscillator are continuous wave solid-state lasers or semiconductor lasers,

wherein each of the continuous wave solid-state lasers has a medium of a single-crystal YAG, YVO_4, YLF, $YAlO_3$, $GdVO_4$, alexandrite, or Ti: sapphire, or a poly-crystal YAG, Y_2O_3, YVO_4, $YAlO_3$, or $GdVO_4$, each of which is doped with one or plural elements selected from the group consisting of Nd, Yb, Cr, Ti, Ho, Er, Tm, and Ta as dopant, and

wherein the semiconductor lasers are a GaN laser, a GaAs laser, and an InAs laser.

5. The laser irradiation apparatus according to any one of Claims 1 to 3,

wherein the first laser oscillator and the second laser oscillator are pulsed lasers having a repetition rate of 10 MHz or more and having a medium of a single-crystal

YAG, YVO_4, YLF, $YAlO_3$, or $GdVO_4$, or a poly-crystal YAG, Y_2O_3, YVO_4, $YAlO_3$, or $GdVO_4$, each of which is added with one or plural elements selected from the group consisting of Nd, Yb, Cr, Ti, Ho, Er, Tm, and Ta as dopant.

6. The laser irradiation apparatus according to any one of Claims 1 to 5, wherein the condensing lens is a cylindrical lens or a spherical lens.

7. The laser irradiation apparatus according to any one of Claims 1 to 6, wherein the first direction and the second direction intersect with each other.

8. A laser irradiation method comprising:

emitting a first laser beam from a first laser oscillator;

passing the first laser beam through a slit to form a second laser beam;

condensing the second laser beam by a condensing lens to form a third laser beam;

delivering the third laser beam to an irradiation surface;

delivering a fourth laser beam emitted from a second laser oscillator so as to cover the third laser beam on the irradiation surface; and

scanning the third laser beam and the fourth laser beam relative to the irradiation surface.

9. A laser irradiation method comprising:

emitting a first laser beam from a first laser oscillator;

passing the first laser beam through a diffractive optical element to form a

second laser beam;

passing the second laser beam through a slit to form a third laser beam;

condensing the third laser beam by a condensing lens to form a fourth laser beam;

delivering the fourth laser beam to an irradiation surface;

delivering a fifth laser beam emitted from a second laser oscillator so as to cover the fourth laser beam on the irradiation surface; and

scanning the fourth laser beam and the fifth laser beam relative to the irradiation surface.

10. The laser irradiation method according to Claim 8 or 9, wherein the first laser beam is a harmonic converted by a non-linear optical element.

11. The laser irradiation method according to any one of Claims 8 to 10,

wherein the first laser oscillator and the second laser oscillator are continuous wave solid-state lasers or semiconductor lasers,

wherein each of the continuous wave solid-state lasers has a medium of a single-crystal YAG, YVO_4, YLF, $YAlO_3$, $GdVO_4$, alexandrite, or Ti: sapphire, or a poly-crystal YAG, Y_2O_3, YVO_4, $YAlO_3$, or $GdVO_4$, each of which is added with one or plural elements selected from the group consisting of Nd, Yb, Cr, Ti, Ho, Er, Tm, and Ta as dopant, and

wherein the semiconductor lasers are a GaN laser, a GaAs laser, and an InAs laser.

12. The laser irradiation method according to any one of Claims 8 to 10,

wherein the first laser oscillator and the second laser oscillator are pulsed lasers having a repetition rate of 10 MHz or more and having a medium of a single-crystal YAG, YVO_4, YLF, $YAlO_3$, or $GdVO_4$, or a poly-crystal YAG, Y_2O_3, YVO_4, $YAlO_3$, or $GdVO_4$, each of which is added with one or plural elements selected from the group consisting of Nd, Yb, Cr, Ti, Ho, Er, Tm, and Ta as dopant.

13. The laser irradiation method according to any one of Claims 8 to 12, wherein the condensing lens is a cylindrical lens or a spherical lens.

14. The laser irradiation method according to any one of Claims 8 to 13, wherein a laser spot of the second laser beam covers the whole beam spot of the first laser beam on the irradiation surface.

15. A laser irradiation apparatus comprising:

a first laser oscillator;

a second laser oscillator;

a slit for blocking end portions of a first laser beam emitted from the first laser oscillator;

an optical fiber for delivering a second laser beam emitted from the second laser oscillator so as to cover a range irradiated with the first laser beam on an irradiation surface.